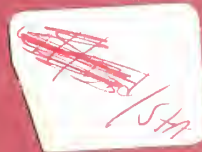


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NEWSLETTER



JANUARY 1992



Ognen prigor

Bacterievuur

Feu bacterien

Ates yanikligi

Colpo di fuoco

Zaraza ogniowa

Paerebrann

Spala

Fuego bacteriano

Kherakhon

Paronpest

Bakteriozna plamenjaca

Ildsot

Feuerbrand

Vaktiriako kapsimo

Lafha nareya

INTERNATIONAL WORKING GROUP
ON FIRE BLIGHT RESEARCH

INTERNATIONAL WORKING GROUP
ON
FIRE BLIGHT RESEARCH

NEWSLETTER

from the

Plant Protection Commission
International Society for Horticultural Science

in cooperation with

U.S. Deciduous Tree Fruit Disease Workers

and

European & Mediterranean Plant Protection Organization

JANUARY 1992

United States Department of Agriculture
Agricultural Research Service

Appalachian Fruit Research Station
Kearneysville, West Virginia, USA

Letter from the Editor

During 1991, no reports have been received of new introductions of fire blight in any major pome fruit producing countries. Thus, Australia, Chile, South Africa, Japan, China, Spain, and the Po and Adige Valleys in northern Italy are still free of this bacterial disease. The only positive reports, received officially from EPPO in Paris, were that fire blight has been recorded in Bermuda, Haiti, and Zimbabwe. Together with Lebanon (1988) and Armenia (1990), there are no details available on the occurrences of fire blight in these five countries.

During the last few years, it has become increasingly more difficult, costly, and time consuming to report all the new literature on fire blight in the newsletter. This year's issue is late going to press and does not include any new publications. At the upcoming workshop in Athens, Mr. Gary Lightner, Computer Specialist, at our Appalachian Fruit Research Station will discuss methods of accessing literature stored in our complete fire blight literature file through various computerized methods. Starting in 1993, we may possibly decide to publish the most significant new publications in the newsletters. The subject will be thoroughly discussed at the workshop. We are looking forward to seeing everyone in Athens.

Sincerely,

TOM VAN DER ZWET
Secretary,
North American Section
International Working Group
on Fire Blight Research

COUNTRIES WITH FIRE BLIGHT

Year	Number	Countries
> 1900	2	USA and Canada
1919	3	New Zealand
1943	4	Mexico
1957	5	England
1962	6	Egypt
1966-70	9	Netherlands, Poland, and Denmark
1971-80	12	Belgium, France, and Germany
1982	13	Luxemburg
1984	14	Cyprus
1985	16	Israel, Turkey
1986	20	Sweden, Norway, Ireland, and Greece
1987	21	Czechoslovakia
1988	22	Lebanon
1989	23	Switzerland
1990	27	Armenia, Bulgaria, Yugoslavia, and Southern Italy
1991	30	Bermuda, Haiti, and Zimbabwe

PRESENT STATUS AND NEW OCCURRENCES OF FIRE BLIGHT

TURKEY

In general, the incidence of fire blight on pear was lower than usual. The full bloom period in Korkuteli, Antalya was cool. Fire blight of apple does not appear to be of a major problem in Turkey. Study on epidemiology and control of fire blight is continued. Growers who applied a spray schedule through bloom with copper oxychloride and maneb mixture and pruning of infected parts were able to maintain good control of fire blight.

I think it is very difficult to make a distribution map of fire blight for Turkey. Fire blight is everywhere. If you have a susceptible quince tree or pear tree even in home gardens, it is very easy to see fire blight symptoms from June.

Timur Momol
Antalya

NETHERLANDS

The year 1991 was an average year concerning fire blight in the Netherlands. Due to the reasonable large amount of fire blight infections in 1990, there were quite a lot of overwintering cankers. In spring 1991, these cankers became active and caused infection in mainly hawthorn. The cold spring prevented a fast further spreading of the disease. When the temperature rose in July, most hostplants did not bloom anymore and escaped infection. In apple, fire blight incidence was very low and in pear there were only scattered infections in a number of orchards. No serious problems were reported.

Rien van Teylingen
Wageningen

GREECE

Mild symptoms of fire blight appeared on the usual hosts in Greece (pears, apples, wild pears and quince). No infections on other hosts (hawthorn, pyracantha, cotoneaster, etc.) were observed. The weather conditions were normal. Heavy shoot and fruit infections were observed in some areas in northern Greece, after light hailstorm occurrence.

Peter Psallidas
Kifissia (Athens)

CZECH REPUBLIC

In 1991, fire blight occurrences were determined in 27 localities in Western and Central Bohemia. In 25 cases the attacked trees were hawthorns, in one case apple and in one case pear. These findings were mainly situated in places where fire blight had already occurred in previous years.

According to the results of weather analysis, the year 1991 in Bohemia was the less favorable for fire blight epidemic development in the last eleven years (1981-1991). This is due to an unusually long period of low temperatures in the first half of the growing season.

Vaclav Kudela
Ruzyne (Prague)



Distribution and spread of fire blight in the Czech Republic

POLAND

Fire blight was not recorded in any new places of the country. Its activity was generally low. In most regions, the weather was cold during bloom and early growth of shoots of apples, pears and hawthorns. Very few infections of apples and hawthorns were found.

Piotr Sobiczewski
Skierniewice

EGYPT

Due to the weather conditions during the 1991 season, mild infection with fire blight had occurred to pear trees in most growing areas. No disease incidence was noticed on other rosaceous plants or new regions.

M.K. El-Kazzaz
Kafr-El-Sheikh

GERMANY

In the northern part of Germany (Schleswig-Holstein), there was dependent on a very early blossom-phase correlated with high temperatures a massive attack on apple blossoms, so that the harvest was marked reduced. Later on only weak infections were found in the typical windbreaker hedges on hawthorn and Cotoneaster varieties. A very low incidence of the disease was found in the other northern areas of the western part of Germany. In the South (Rheinland-Pfalz, Baden-Wurttemberg) sporadic focuses were observed because of cool weather in May/June during blossom period and very dry conditions later on. Only in the Neckar/Main area between July until October a strong attack was found on apple (Summerregent) and pears (Williams, Clapp's, Gute Luise, Gellerts) during a warm humid period, so that two pear orchards had to be eradicated. Also ornamentals, especially Cotoneaster salicifolius floccosus and hawthorn were attacked.

Wolfgang Zeller
Dossenheim (Heidelberg)

In 1991 in the eastern part of Germany only some small outbreaks of fire blight occurred. Apple, pear and hawthorn were attacked. In Saxonia, a pear orchard (30 ha) must be eradicated because of fire blight incidence,

Klaus Naumann
Aschersleben

IRELAND

The disease was diagnosed only twice during 1991 - on plants of *Sorbus aria* and *Cotoneaster salicifolius* from two Dublin suburbs. The diseased plants were destroyed. Weather conditions were not favorable to the development of the disease during 1991. Blossom blight has never been observed here.

Patrick Walsh
Dublin



Location of fire blight in the Republic of Ireland.

FRANCE

A severe frost in April has induced secondary bloom in a number of pear orchards, as well as a reduction in sprays and visits during the growing season, linked with the absence of crop. This led to some severe attacks in autumn (sometimes as late as late October).

The activity of the disease is estimated as high (worse than 1990) in pear in most of the contaminated areas. Numerous secondary blossom infections on apple (Golden Delicious) have been noticed.

A new contaminated zone was reported in August: 40 km north of Lyon in two Passe Crassane (pear) orchards. These were young infections. The orchards were destroyed soon (attempt of eradication).

An unusual indirect symptom of fire blight in the orchard seems to have been common in 1991; a die-back of the tree (apple due to a complete necrosis of the rootstock (origin of the infection usually unknown, but not originating from the nursery). This is a very destructive form of the disease.

Jean Pierre Paulin
Beauconze (Angers)

CYPRUS

The weather conditions during the 1991 pear blooming period were not favorable for fire blight development. Infections were almost unnoticed. Later on, in certain areas, during apple bloom, they favored damage on the susceptible apple cv. "peas good non-such".

On pear, fire blight is generally well detained when good cultural practices including good pruning are applied together with timing of chemical applications (Firestop or Quinolate) (determined according to Thomson et al mean temperature prediction system). In this way, only 1-3 applications are required instead of 7-9 on routine base.

Under the provisions of the scheme for the replacement of the susceptible to fire blight pear and apple cultivars, the uprooting of about 5,000 trees, severely damaged by previous year infections, was subsidized. In addition, the purchase and planting of about 2,200 young trees was also subsidized, for the replacement of the uprooted ones.

Maria Dimova-Aziz
Nicosia

CROATIA

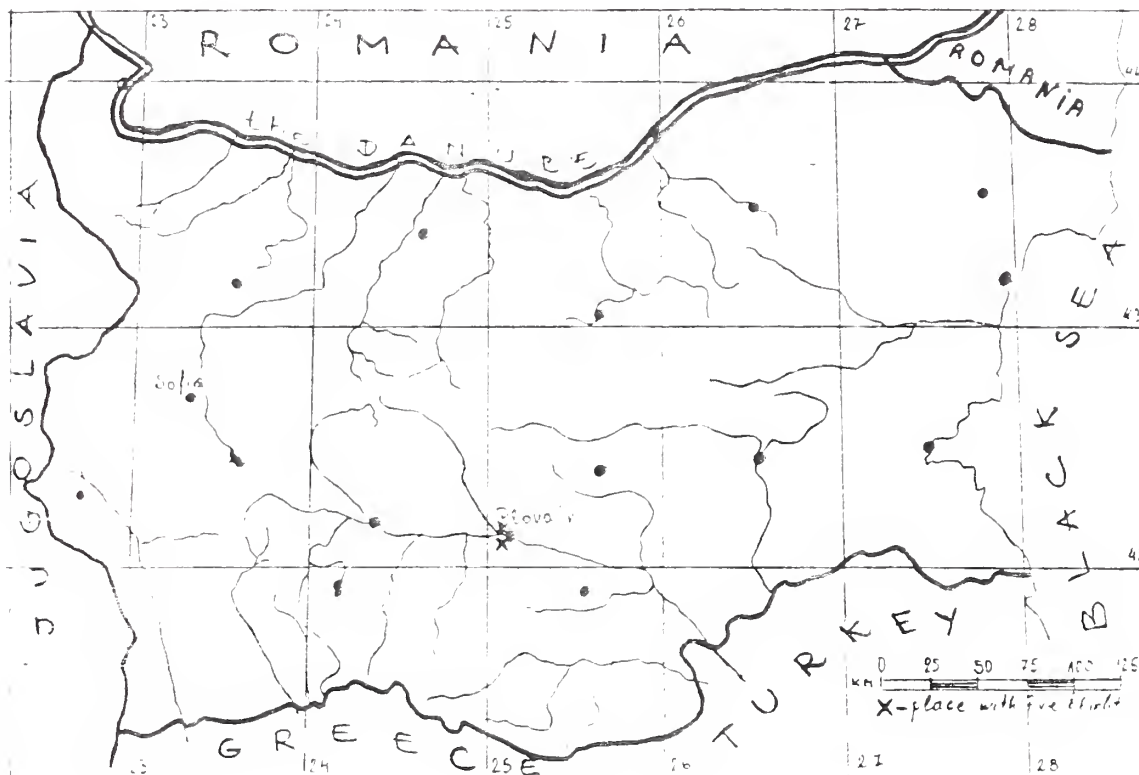
Fire blight is not yet present in Croatia. Before the war I went to see the infected plantation not far from Zagreb in the Republic of Bosnia. There we made isolations of Erwinia amylovora and introduced the Billing-forecast system. We conducted trials with antibiotics (Kasumin, Streptomycin sulfate, and Flubactin). Unfortunately, owing to the war we can no longer go there.

Bogdan Cvjetkovic
Zagreb

BULGARIA

Fire blight had been detected in two places in the central part of our country, first by Dr. S. Bobev in quince and later by Dr. Bogatsevska in pear. The two regions were at a distance of 10 kilometers. There are no data about the spread of fire blight in other hosts of Rosaceae family. In the autumn of 1991 both diseased orchards were uprooted.

Roumen Penev
Plovdiv



Location of fire blight in Bulgaria.

MEXICO

Fire blight has been reported and identified on pear, apple, quince and firethorn in Mexico. The states in which fire blight has been present until now are the following:

	Apple (<u>Malus</u>)	Pear (<u>Pyrus</u>)	Quince (<u>Cydonia</u>)	Firethorn (<u>Pyracantha</u>)
1. Chihuahua	+	+		
2. Durango	+	+		
3. Zacatecas	+	+		
4. San Luis Potosi		+		
5. Jalisco		+		
6. Michoacan	+	+		
7. Mexico	+	+	+	+
8. Puebla	+	+		
9. Hidalgo			+	

Leopold Fucikofsky
Montecillo



Distribution of fire blight in Mexico.

BELGIUM

Many problems of fire blight on young 'Conference' pear trees between 2-10 years old. Infections during secondary blossom in August-September. Formation of cankers on the trunk, many of them with undetermined margins. No symptoms on the leaves during the first week after infection. This makes detection in early stage very difficult. Sporulation on the cankers early in season: many filaments (yellow or white). A close observation is necessary to detect them. The presence of some cankers of this type during primary bloom led to losses of 300-400 trees per ha due to massive primary blossom infections.

Tom Deckers
St. Triuden

NORWAY

During 1991, fire blight was not observed outside the original area, and within the area, only few new incidents were found. The eradication program is continued. The two most important hosts, Cotoneaster bullatus and C. salicifolius, are now almost completely removed from the district.

Arnold Sletten
As

ISRAEL

Fire blight was more severe in 1991 than in previous years. After the very few infections of pear blossoms in 1989 and 1990, Erwinia amylovora infected many pear and apple orchards. The disease was prevalent in apple orchards in regions where the disease had not been detected in the past. In some apple orchards in northern Israel (Galilea and the Golan Heights), hundreds of trees were infected with fire blight. Cv. Jonathan was the most infected apple variety but Granny Smith, Golden Delicious and even Red Delicious cultivars were infected. In some trees more than 50 strikes were evident, but none of the apple trees died. First fire blight symptoms were evident in pear orchards, three weeks after the bloom period. It is assumed that the rains of 21-24 March during the pear-bloom period incited the disease. Rainy days and high temperatures occurred on 9-10 April during the early bloom period of the apples. Fire blight was evident in apple orchards during May. It is suspected that streptomycin resistance of E. amylovora is the cause of unsatisfactory control of fire blight in two pear orchards in the south where the disease was found in 1986 and since then 3-5 streptomycin treatments were applied annually. Resistance monitoring and research is being conducted.

Ezra Shabi
Bet Dagan

ITALY

In 1991, some infections of fire blight, much less severe than in 1990, were observed in the Puglia region on pear trees cv. 'Bella di Giugno', 'Dr. Guyot' and 'Williams'. The disease did not spread outside the points where the first outbreak was reported near Lecce. The pathogen was not detected on the cvs. 'Coscia', 'Abate Fetel', 'Precoce Morettini', 'Butirra Giffarda', 'Melfi', 'Santa Maria', (Cariddi and Piglionica, 1991).

In May 1991, a new focus was discovered in Sicily (district of Messina, near Messina). The disease was observed on about 2% of 4 years old pear trees cv. 'Bella di Giugno' and 'Faccia di Donna' grown in an orchard of about 4 hectares. At the end of June, wide cankers associated with copious ooze were seen even on the trunks. Infected trees were destroyed.

In the summer 1991 (Curto, 1992), phytosanitary inspections carried out by the Osservatorio per le Malattie delle Piante of Bologna (OMP-BO) led to the discovery of symptoms of fire blight on hawthorns imported from Holland (once again) and transplanted in the nursery just some weeks before. The whole lot of plants was destroyed; careful inspections done within a range of 4 miles were always negative.

Carlo Bazzi
Bologna

SWITZERLAND

In Switzerland, fire blight has not extended more than in the last two years before. The disease is limited in the Northeast, in the region of the lower Bodenses. In 1991, for the first time, fire blight was found in a Conference pear orchard. When the disease was detected, some trees were immediately removed. Fire blight was found again on Cotoneaster dammeri. In our monitoring program we proved once more epiphytic E. amylovora in two cases on C. salicifolius. The law has not changed: no imports of host plants are allowed (except for quarantine measures) and strict field controls have to be done. The monitoring program is going ahead.

Richard Grimm
Wädenswil

PENNSYLVANIA

Environmental conditions were highly favorable for blossom blight during full bloom stage. Blight occurred on pear and on susceptible cultivars of apple (York Imperial, Jonathan, Gala, Rome Beauty) in blocks previously infected with blight. Some shoot blight occurred but was not of major incidence.

Kenneth Hickey
Biglerville

ENGLAND

In general, in S.E. England in apples and pears the weather has not been favorable for fire blight over the last two seasons. In 1990 temperatures were favorable, but lack of rain made outbreaks very sporadic. In 1991, temperatures were very low until July when conditions became more favorable, but by then the apple and pear trees had slowed down growth and there was less susceptible tissue available for infection. Outbreaks were therefore again sporadic.

There is a high level of inoculum in hawthorn hedge, which given favorable conditions at pear primary blossom time, could result in severe losses. So far conditions have not been favorable at this time of year, but the potential remains.

Angela Berrie
Ashford

Established in England and Wales in the area outside the Fire Blight Free Region (Northumberland, Cumbria, Tyne and Wear, Durham, Cleveland and N. Yorks excluding Dist. of Selby and Borough of York). Elsewhere of sporadic occurrence as introduced on imports. Outbreaks in the FBFR are believed to have been eradicated.

No records as yet from Cornwall.

David Ebbels
Harpenden

Hawthorn (Crataegus) trees in a limited area of Kent are regularly observed. In 1991, very few new infections were seen. Blossom infections were present on a few early flowering trees which had open flowers in mid-April when there was a three day warm period (maximum temperatures 20-21°C). For most of the main flowering period, temperatures rarely exceeded 15°C. Disease progression in stems (arising from 1990 infections) was seen from mid-April onwards and some trees showed moderate die-back of small branches by July.

Eve Billing
Tonbridge

WASHINGTON

Early blossom period warm weather caused minor fire blight problems in some pear and apple orchards, but spring weather turned cooler than normal until mid-June, helping us avoid more general problems. Apples most affected were older Jonathans and Young Galas. Vigorous 2nd year Galas were damaged severely or killed in a few isolated instances. Except in these early, warm areas fire blight was at its lowest level in years in Washington State pears and apples.

Tim Smith
Wenatchee

SWEDEN

Due to the very cold spring and start of summer 1991, the outbreaks of the disease were very limited. During 1991, we found some new locations on the west coast in Sorbus aria.

The usual survey was carried out during the growing season in orchards, plantations and especially in nurseries.

Maria Graberg
Jonkoping



Distribution of fire blight in southern Sweden.

INDIANA

For the 1991 growing season fire blight was moderate to severe in many northern Indiana apple orchards. The full bloom period coincided with ideal conditions for infection, resulting in the above normal occurrence of fire blight for northern Indiana.

Paul Pecknold
West Lafayette

OHIO

1991 was a year of severe fire blight in many locations throughout Ohio. Incidence was scattered, but where it occurred it was very severe.

Dr. Steiner's Fire Blight model did a good job of indicating high risk periods in bloom.

Mike Ellis
Wooster

SOUTH CAROLINA

Increasing plantings of susceptible cultivars like Fuji, Granny Smith, Braeburn, etc. the predominant root stock is 7A. Some Asian pear plantings are escaping with zero incidence of fire blight despite presence of bacterium in other nearby hosts. We are encouraged with the "Maryblyt" program and are setting up radio operated weather station network to provide real time weather information.

Walker Miller
Clemson

MICHIGAN

Fire blight was a major problem on apples in southwest Michigan in 1991 where losses were estimated at \$3,863,870 by local extension personnel. Multiple infection periods (daytime temperatures in the mid-80's and rainfall or fog) were ideal for blossom infections and secondary spread to shoots. Additional factors that contributed to the epidemic were unusually high winds and driving rain in mid-summer. Many orchards that escaped infection at bloom developed severe infection including infection to the rootstocks. However, the disease was a minor problem on pears.

More outbreaks of streptomycin-resistant E. amylovora were detected in 1991. We are continuing research of the molecular genetics of this resistance.

Alan Jones
East Lansing

NEW BRUNSWICK

Fire blight is not a problem in New Brunswick. I have contacted other researchers in this regard and they too are of this opinion. The only fire blight we have in the province is that which comes in on plant material from abroad. It doesn't seem to overwinter here. This also seems to be the case in Nova Scotia, our neighbouring atlantic province.

Jean Pierre Prive
Bonctouche

NOVA SCOTIA

Fire blight was once again present as a twig blight on a couple of farms in the center of the Annapolis Valley. The disease intensity was very low and this may have been the result of a dry summer with low humidity. The disease does not appear to move from infected pears to adjacent apples or from apples to pears. The disease continues to be confined only to a couple of farms.

Gordon Braun
Kentville

BRITISH COLUMBIA

The present status of fire blight in British Columbia is that it occurs but has not been a serious problem for pear growers. Pear acreage has been decreasing in recent years due to problems unrelated to fire blight. For the first time in this region fire blight occurred on Gala apples causing extensive damage in a young planting.

Peter Sholberg
Summerland

ALBERTA

In central Alberta (Edmonton), fire blight can be severe on raspberries, particularly c.v. Boyne. Severe flower (blossom blight) can reduce fruit set to less than 10% of expected yield - bees do a very good job of dispersal! Small fruit growers do not notice this unless it is specifically pointed out. Canes look healthy except for dead flowers (no berries). A gold cultivar ('Rocky mountain' or 'Honey queen')(not sure of c.v.) seems much less susceptible. Only 10 to 30% loss, whereas 'Boyne' could lose 100% of flowers in same planting. Could be resistance or time of flowering? Up to 50% of current season canes of c.v. 'Boyne' may blacken and die back (fire blight) in some seasons. Growers are reluctant to believe that this is fire blight. Raspberries are very common wild fruits in Alberta (good medium sized berries)

Ieuan Evans
Edmonton

ONTARIO

Weather. Warm temperatures and adequate rainfall initiated an early spring with degree days ($>5^{\circ}\text{C}$) 14-20 days ahead of normal by June 16. High temperatures ($>30^{\circ}\text{C}$) and humidity were persistent throughout the summer. In the extreme southwest, drought conditions occurred from mid-June through August.

Phenology. Warm temperatures in early spring forced bud break in the first week of April in Essex/Kent, followed by other parts of the province later in the month. Warm temperatures in late April initiated bloom in pears followed by bloom in apples in May. Petal fall was complete in apples by mid-May in Essex/Kent and by the third week in many other locales west of Toronto. Accumulated heat units by June 16 were ahead of normal by 33% in Smithfield and 47% in Simcoe. By harvest the accumulated heat units above normal resulted in harvest being 10-14 days ahead of normal.

Fire blight. During the pear bloom average temperatures were usually below 15°C with little rainfall. Pear blossom blight was not a major threat in most areas of Ontario except in Niagara where conditions were slightly more favorable for blossom blight. In contrast, weather conditions during apple bloom were almost ideal for fire blight infection and spread. Average temperatures were very often above 18°C , frequent rainfall occurred, and pollinating insects were very active.

Blossom blight was first observed May 21 in Essex Co. on 'Paulared' apple. This was followed by observations of canker blight on May 23 and shoot blight on May 27. The week of May 26 recorded reports of fire blight from Norfolk Co., Niagara region, and Wentworth Co. By the week of June 2, fire blight infections were also being reported from the Middlesex area on apples. By the week of June 9, fire blight was becoming serious in areas west of Toronto and several reports were also received from Grey Co. and the Bay of Quinte area. By mid-June, fire blight had occurred in all apple-growing regions, however, regions north and east of Toronto did not have any serious problems that could not be contained.

The 1991 season was one the worst seasons for fire blight during the past 15 years. Ideal disease conditions during apple bloom were probably responsible for initiating fire blight disease in the blossoms of apples, especially susceptible cultivars. The conditions for blight were a source of inoculum, pollinating insects, warm temperatures, adequate moisture, and susceptibility. Disease severity varied among orchards as a result of variations in the factors mentioned above. Many orchards west of Toronto sustained damage as a result of fire blight being initiated during bloom and continuing to be spread during the growing season. Damage ranged from light infections to severe damage of fruit clusters, shoots and supporting branches and limbs. Significant tree loss has occurred in Essex, Middlesex, Norfolk, Niagara, and Wentworth areas.

Very little control of fire blight during the blossom period was attempted in Ontario in spite of good conditions for fire blight infection and OMAF Agriphone warnings. Streptomycin was applied, however, when numerous infections started to appear in orchards in June. Breaking out/pruning out

infections was practiced to remove the sources of inoculum. Attempts to stay ahead of the disease were largely futile as infections kept on appearing in the tender young shoots of actively growing trees. Fire blight did eventually slow down in July with the arrival of hot dry weather but not before damage had occurred, especially in young susceptible trees.

Gordon Bonn
Harrow

AUSTRIA

No fire blight detected in Austria.

Marianne Keck
Vienna

PORTUGAL

As far as I know, fire blight did not yet occur in Portugal.

J.M.S. Martins
Oeiras

SOUTH AFRICA

Fire blight does not occur in South Africa. However, Erwinia amylovora is regularly isolated from vegetative propagating material and seed (especially apple) shipped to South Africa.

Martin Hattingh
Stellenbosch

AUSTRALIA

1. As to my report fortunately there has been no change to Australia's fire blight - free status:

"Fire blight has not been recorded in Australia and stringent quarantine procedures apply on the import of susceptible host material".

2. Dr. Satish Wimalajeewa, Institute of Plant Sciences, Knoxfield, Victoria is planning:

(a) A study to assess the "Maryblyt" system in the Goulbourn Valley of Victoria. [This region produces some 85 percent of Australian pears and 10 percent of the nation's apples and is climatically "highly conducive to the establishment of and continued reinfection by fire blight" (Kilminster 1989).] and

(b) A survey of epiphytic bacteria present on pome fruit in the region.

David Cartright
Adelaide

PEOPLES REPUBLIC OF CHINA

Fire blight has not been recorded in P.R. China. As the Law on quarantine of Animal and Plant Exits and Entrances, PRC has passed, Erwinia amylovora is on the A1 lists, more stringent quarantine measures will apply on the import of susceptible host materials.

Youfu Zhao
Beijing

ALGERIA

Fire blight is not observed for the moment in our region.

N. Nassan-Aga
El-Harrach

OREGON

Conditions during the 1991 bloom were cool and not favorable for fire blight development throughout Oregon. Many samples were received from growers inquiring about fire blight. Most of these diseased plant samples were due to another common bacterial pathogen, Pseudomonas syringae.

Medford (Rogue River) Area - Dr. David Sugar reports that it was a "mild" fire blight year and that only a few cankers were found in commercial orchards.

Hood River Valley - Dr. Bob Spotts reports that very little fire blight was observed. A few cankers were found in five orchards. None of the isolates were resistant to streptomycin.

Milton-Freewater Area - Tom Darnell reports that only one strike was found in the area on apple.

Jay Pscheidt
Corvallis

VIRGINIA

Very concerned about loss of trees to fire blight in high density plantings. In one planting of Redchief (Campbell strain)/M26, tree loss was 1.7% (750 of 44,000 trees) due to blight in the rootstock.

Keith Yoder
Winchester

DETAILS ON CURRENT FIRE BLIGHT RESEARCH REPORTED FROM UNIVERSITIES AND EXPERIMENT STATIONS

GREECE

The current fire blight research projects in Greece are:

1. Screening different epiphytic bacteria for in vitro and in vivo inhibition of Erwinia amylovora for biological control purposes (Benaki Phytopath. Inst.).
2. Streptomycin resistance among Erwinia amylovora strains from different areas of Greece.
3. Breeding for fire blight resistance in pears. (Pomology Institute of Naoussa).
4. Chemical control of E. amylovora and varietal susceptibility to fire blight of different host plants of Mediterranean origin. (Plant Protection Inst. of Volos).
5. Climate and fire blight epidemics. (Benaki Phytopath. Inst.).

P. G. Psallidas
Benaki Phytopath. Inst.

POLAND

1. Observations on fire blight activity and development upon phenology of apples, pears and hawthorns.
2. Screening for selection of effective chemicals against fire blight.

P. Sobiczewski
Res. Inst. of Pomol.

GERMANY

A new sensitive detection method by PCR-analysis for the monitoring of fire blight was developed by the working group Geider (Heidelberg). Studies on the resistance-induction effect of plant extracts on E. amylovora were undertaken by the group of Zeller/Mosch in Dossenheim and Darmstadt. First results showed a higher activity of some enzymes of the phenol metabolism between 1 and 4 days after exposure of extracts.

W. Zeller
Biol. Bundesanstalt

As a consequence of the reunification of Germany the BZA Berlin and the Institut für Phytopathologie Aschersleben have finished their activities on December 31st, 1991. However, with the beginning of 1992 the new Federal Institution for Breeding Research on Cultivated Plants was founded. Three institutes of this organization are located at Aschersleben (Institut für Pathogendiagnostik, Institut für Epidemiologie, Institut für Resistenzforschung). In cooperation with Mrs. Prof. Fischer (Institut für Obstzuchtung Dresden-Pillnitz), Dr. Richter (Institut für Epidemiologie) will continue his work concerning the development of cultivars with resistance against fire blight in apple and pear.

K. Naumann
*Bundesanst. für
Züchtungsforschung*

ITALY

a) As already mentioned in the previous newsletter, the Italian Ministry of Agriculture has issued directions for the compulsory eradication of the disease (uprooting and destruction of the infected trees) in the Puglia region. These directions are enforced with the support of the special decree issued by the regional government on December 1990.

Starting since late July 1990, antisera produced at the Department of Plant Disease Protection in Bari, are currently used for monitoring the presence of the pathogen.

b) Phytosanitary inspections in nurseries and orchards led to the discovery of the new occurrence of fire blight in Sicily and the interception of infected hawthorns imported from Holland. In both cases blighted plants were promptly destroyed.

c) The breeding program for fire blight resistance is still in progress at the Istituto Sperimentale per la Frutticoltura in Rome (EEC Fire Blight Working Group). On September 1991, the evaluation of about 5800 seedlings was at the end of the second year of inoculation; the remaining seedlings (about 800), need one more year of observation. In cooperation with the Centers in Dax (France) and Naoussa (Greece) it will be possible to evaluate fire blight resistance as well as the agronomical aspects of the most interesting seedlings or Italian varieties in different climates.

d) A fire blight monitoring network was set up in Northern Italy in 1991, but this system will soon cover all of Italy, and in particular the most important fruit-growing areas. One of the main aims of the Italian network is the prompt detection of primary foci of the disease for the application of coordinated control strategies.

e) An assessment of the origin of some species of birds, potential vectors of the bacterium during their migration across Italy has been done in cooperation with ornithologists of the Istituto Nazionale di Biologia della Selvaggina (Ozzano dell'Emilia, Bologna).

Topics d), e) will be presented at the 6th Int. Workshop on fire blight in Greece.

C. Bazzi
Istit. Patol. Veget.

BULGARIA

1. Serological diagnostic methods for E. amylovora and possibilities of chemical control. (Agricultural University, Plovdiv).

2. The effect of climate on the development of fire blight and evaluation of the susceptibility of local cultivars and selections. (Fruit Growing Institute, Plovdiv).

R. Penev
Fruit Grow. Inst.

ENGLAND

At Wye we do not carry out research on fire blight, but make use of Billings Risk assessment system for meteorological stations in our area in order to produce warnings of fire blight risk for growers.

A. Berrie
Wye College

OREGON

Dr. Bob Spotts continues to evaluate the new Maryblyt program. A few strikes were reported but the program did not identify any potential infection periods. Some high risk days were detected. This program will again be evaluated this coming growing season.

Dr. David Sugar is evaluating varieties from various breeding programs for fire blight resistance in the Medford area.

Drs. Ken Johnson, Virginia Stockwell, and Joyce Loper are continuing research on biological control transmission by honey bees and screening isolates for resistance to bactericides.

J.W. Pscheidt
Oregon State Univ.

PENNSYLVANIA

Results from research by Gregory G. Clarke (Penn State Doctorate Thesis Research) on the role of aphids in transmission of *E. amylovora*, showed that green apple aphids were unable to vector the pathogen in the conventional manner of acquisition, migration, and injection. Various type tests, including membrane fed aphids, aphid feeding wounds as points of entry, and aphid colony transfer from infected to healthy shoots, failed to result in any infection resulting from vectoring by aphids. In separate shoot syringe-inoculations, the number of colony forming units required for infection was 1×10^4 or more. A single cell or concentrations of 10^1 , 10^2 , 10^3 failed to cause blight in shoots of 'York Imperial' apple.

The development of a computerized decision support system for fireblight management will be ready for field validation in 1992. The system will be incorporated into the existing Penn State Apple Orchard Consultant (PSAOC) where users can choose to run the fire blight module separately as they would for apple scab or powdery mildew, or as part of the IPM module which provides management information about all disease and insects. The fire blight module will assess orchard risk at the beginning of the season by evaluating the relative susceptibility of cultivars and rootstocks, the recent history of fire blight in the orchard, the nutritional status of trees, and certain site characteristics. During bloom, the system will use weather data to evaluate the daily risks for blossom infections and give recommendations for treatment when necessary. After the blossoming period the system will provide recommendations for managing fire blight using a variety of cultural methods, and suggest control strategies in the event of hail or other trauma. The system will also have an educational module where users will be able to access detailed information about the disease and various aspects of its management.

Ken Hickey
Penn State Fruit Res. Lab.

WASHINGTON

Renewed interest in fire blight research has attracted some new people this past 2 years. In the pacific northwest we now have research on biocontrol and epidemiology with ever increasing funding and effort.

Below are listed the new researchers and their general interests:

Dr. Gary G. Grove, Assistant Plant Pathologist, Washington state University, Tree Fruit Research and Extension Center. 1100 N. Western Avenue, Wenatchee, WA 98801. Epidemiology-Prediction.

Dr. Randy McLaughlin - Plant Pathologist, USDA-ARS, Tree Fruit Research Center, 1100 N. Western Avenue, Wenatchee, WA 98801. Biocontrol-antagonists.

T. Smith
WSU Extension

MARYLAND

MaryblytTM, Version 4.0, a comprehensive computer program for predicting specific infection events and symptom development for most phases of fire blight epidemics in apples and pears is now available commercially. The program has been the principal basis for recommendations on fire blight control to Maryland fruit growers since 1989 and has resulted in both a marked improvement in the level of control-obtained and a reduction in the number of antibiotic sprays applied compared with conventional treatment programs.

One of the unique features of MaryblytTM is that it identifies specific infection events and predicts the appearance of four distinct types of fire blight symptoms: blossom, canker, shoot and trauma blight. The program can be operated in real time to assess the current risks and progress of an epidemic, and in a simulation mode for predicting future events using forecast weather data. Information generated in both modes provides a basis for making decisions on when to make specific control treatments and when it is reasonably "safe" to delay those treatments.

The MaryblytTM program is fully compiled in Turbo-Pascal and can be operated with any IBM or IBM-compatible personal computer, including most laptop models. It requires a RAM capacity of 640 kilobytes (kb) and a VGA (preferred), EGA color or a monochrome monitor. The program can be operated directly from a floppy disc or, for faster operation, from a hard disc. The compiled program requires about 170kb of disc space and individual files normally range from 3 to 6 kb.

Daily information on temperature, rainfall and other significant weather events (dew, hail, damaging winds) along with key observations on apple and pear bud development are needed to use the program. For this reason, the user should consider investing in a reliable on-site recording weather station. All weather data can be entered or retrieved in either English or metric units.

MaryblytTM is available through the University of Maryland Office of Technology Liaison, 4312 Knox Road, College Park, Maryland 20742 [telephone: 301-405-4210, telefax: 301-314-9871].

P.W. Steiner
Univ. of Maryland

NETHERLANDS

In the Netherlands no new fire blight research projects have been started in 1991. In October 1991 our trial plot in Ouwerkerk (Zeeland) has been closed down.

M. van Teylingen
Plant Protect. Inst.

AUSTRALIA

Peter Fahy and Mike Gillings of Biological and Chemical Research Institute, PMB10, Rydalmere NSW 2116, Australia have initiated a study to examine the diversity of Erwinia amylovora using genomic fingerprints, fatty acid profiles and nutritional tests. They aim to examine cultures from as wide a range of sources as possible and to include "amylovora like" bacteria. They would appreciate contact with anyone with interesting cultures or host isolations.

D. Cartwright
S.A. Dept. of Agric.

MISCELLANEOUS NEWS

Dr. Timur Momol, from the University of Akdeniz, Turkey, spent three months with Dr. W. Zeller at BBA, Institut für Pflanzenschutz im Obstbau, Dossenheim, Germany. (Disease Progress Curves and Control of Fire Blight).

Dr. P.G. Psallidas, Dr. J. Tsiantos and Dr. S. Manganaris participated in the meeting of Contractants of EEC-DG VI "Fire blight" Contract 8001-CT91-0203, organized by Dr. J.P. Paulin (Coordinator of the program) in Dax on October 29 and 30, 1991.

Dr. P. Sobiczewski spent 15 months (July 1990-September 1991) in the laboratory of Professor Alan L. Jones at Michigan State University doing research on streptomycin resistant epiphytic bacteria in Michigan apple orchards and on susceptibility of cherries to bacterial canker and frost.

On the way back to Poland he visited Dr. T. van der Zwet and Dr. W. J. Janisiewicz at AFRS Kearneysville and Professor P. Steiner at University of Maryland, College Park, where he presented a seminar entitled: "Streptomycin Antibiotic Resistance in the Pathogen, Erwinia amylovora, and Non-Pathogenic Epiphytic Bacteria Common to Apple Foliage".

Dr. Henk Schouten has stopped doing fire blight research in The Netherlands and is saying farewell and good luck to all his friends and colleagues in the fire blight working group.

A national meeting on fire blight was held in Ladenburg near Heidelberg from June 13-14, 1991 under the guidance of Dr. W. Zeller, Dossenheim. Forty-five participants were discussing new aspects of the disease: distribution in the west and east part of Germany with measures of control, Epidemiology, Control, Diagnosis, Physiology and Genetics, Resistance. Twenty-two papers were presented.

Dr. Zeller visited from November 8-15th the University of Alexandria, Egypt. With colleagues of the Department of Plant Pathology (Prof. Abo-El-Dahab, Dr. A. Shoeib and Dr. El Kazaz) a new program on fire blight research was initiated with the main topics: Forecasting, Resistant Varieties, Biological control.

At the end of 1991, Prof. Dr. H. Kleinhempel, former member of the fire blight group, has finished his work in this field with the liquidation of the Institut für Phytopathologie Aschersleben.

Prof. R.N. Goodman (Missouri) spent his sabbatical leave for 5 months in Wadenswil.

Dr. David Sugar gave an invited lecture on fire blight control at the first international pear course held in Rio Negro, Argentina, April 1991.

The Australasian Plant Pathology Society Conference which was held in Sydney on October 9-11, 1991 included a symposium on the safe movement of plant materials. Tom van der Zwet provided us with a very polished talk on the various means of dissemination of the fire blight bacterium. A follow up session on fire blight served to highlight just how much we still don't know about the disease.

Professor Jim Cummins visited South Australia in late November 1991 as part of his review of Australia's Pomefruit breeding programs. Professor Cummins visited most States and provided a series of grower seminars on apple and pear rootstocks, fire blight and breeding for disease resistance.

Professor Zhang, Zhiyong, Beijing, PRC passed away on August 25, 1991.

LIST OF PERSONS INTERESTED IN FIRE BLIGHT ^{1/}

Abo-El-Dahab, M. K., Plant Pathology Dept., Faculty of Agric., Univ. of Alexandria, Alexandria, Egypt.(71960)	(2)	EGY
Agriculture Canada, Library Records Division, Ottawa, Ontario K1A 0C5, Canada.	(2)	CND
Aldwinckle, H. S., Department of Plant Pathology, N.Y. State Agric. Expt. Station, Geneva, NY 14456. (315-787-2331; FAX: 787-2397)	(1)	USA
Arsenijevic, M., Faculty of Agric., Inst. for Plant Prot., D. Obradovica 8, 21000 Novi Sad, Yugoslavia.(021-58-366)	(2)	YUG
Balavoine, P., Service de la Protection des Vegetaux, Direc. Dept. Agric. et de la Foret, 7 Avenue de Lyon, 73018 Chambéry Cedex, France.(79-690545)	(1)	FR
Basim, H., Guvenlik Mahallesi Kazim Karabekir Cad., 256 Sok. No. 2, Hatipoglu Apt. Daire II, Antalya, Turkey	(1)	TUR
Baykal, N., Agric. Univ. Ziraat Fakultesi, Fitopatoloji Kursusu, Ankara, Turkey.	(2)	TUR
Bazzi, C. , Laboratorio Fitobatter., Ist. Patol. Vegetale, via Filippo Re 8, 40126 Bologna, Italy. (051-351446; FAX: 351438).	(1)	ITA
Beer, S.V. , Department of Plant Pathology, Cornell University, Ithaca, NY 14853. (607-255-7870; FAX: 255-4471).	(1)	USA

^{1/} Names in **bold print** are contact persons for preparation of fire blight newsletter. Numbers in parentheses are local telephone and FAX numbers, and those in column at right indicate activity or interest in fire blight:

1. Actively engaged in fire blight research;
2. Indirectly interested in fire blight;
3. Interested in fire blight, but located in region where disease is not present;
4. Retired but still interested in fire blight activities.

NOTE: For telephone country code numbers, see table at end of this listing. For FAX numbers, area or regional code was not repeated.

- Bell, R.L., U.S. Department of Agriculture, Appalachian Fruit Research Station, 45 Wiltshire Road, Kearneysville, WV 25430-9802, (304-728-2353; FAX: 728-2340). (1) USA
- Berrie, Angela M., Minist. of Agric., Fish and Food, Agric Devel. and Advis. Serv., Olantigh Rd., Wye Ashford, Kent, England. (233-812761; FAX: 813346) (2) UK
- Biggs, A. R.**, West Virginia Univ. Expt. Farm, Kearneysville, WV 25430 (304-876-6353; FAX: 876-6034) (1) USA
- Billing, Eve, 4 Fromandez Drive, Horsmonden, Tonbridge, Kent TN12 8LN, England. (089-272-2807; FAX: 272-3248) (1) UK
- Bobev, S., Dept. of Phytopath., Highes Inst. of Agric., Mendelev Str. 12, 4004 Plovdiv, Bulgaria (2-34-98-(226)). (1) BUL
- Bolay, A., Section de Phytopath., Station Federale de Rech. Agron. de Changins, 1260 Nyon, Switzerland. (022-615451) (2) SWT
- Bonn, W. G.**, Agriculture Canada, Research Station, Harrow, Ontario NOR 1G0, Canada. (519-738-2251; FAX: 738-2929) (1) CND
- Botden, R. J. J., Plant Protection Service, Geertjesweg 15, 6700 HC Wageningen, The Netherlands (08370-96463) (1) NL
- Braun, P. G.**, Agriculture Canada, Research Station, Kentville, Nova Scotia, B4N 1J5, Canada. (902-678-2171). (2) CND
- Brown, Susan K., Department of Pomology & Viticult., N.Y. State Agric. Expt. Station, Geneva, NY 14456 (315-787-2235) (1) USA
- Burkowicz, A., Instytut Sadownictwa, 83-111 Milobadz, Poland. (2) POL
- Bushong, J. W., Microb. Products, 3M Center, Bldg 225-55-01, 3M Company, St. Paul, MN 55144. (612-733-4758) (2) USA
- Byrde, R. J. W., Long Ashton Research Station, Bristol BS18 9AF, England. (027-239-2181) (4) UK
- Cadic, A., Station d'Amelior. des Especies Fruit. et Ornementales, INRA, Beaucouze 49070 Angers, France. (16-41-73.51.25). (2) FR
- Calzolari, Alessandra, Osservatorio Malattie Piante, Via di Corticella 133, 40129 Bologna, Italy. (051-352917) (2) ITA
- Cao, R., Department of Plant Prot., Zhejiang Agric. Univ., Hangzhou, Zhejiang, Peoples Republic of China. (42605). (3) CHI

- Carrera, M., Dept. Agriculture, Ganad. y Montes, Serv. Invest. (3) SPN
Agaria, Apt. 727, 50080 Zaragoza, Spain.
- Cartwright, D. N.**, Plant Quarantine Div., South Austr. Dept. (3) AUS
of Agric., Box 1671, G.P.O., Adelaide, South Australia
5001. (08-266-8433; FAX: 369-0649).
- Cazelles, O., Station Federale de Recherches Agronomiques de (2) SWT
Changins, 1260 Nyon, Switzerland. (022-63-43-60)
- Centre for Agricultural Publishing and Documentation (PUDOC), (2) NL
P.O. Box 9100, 6700 AA Wageningen, The Netherlands.
(08370-84440)
- Chevalier, R., Laboratoires Riker, 3M Sante, Ave. du 11 (2) FR
Novembre, 45312 Pithiviers Cedex, France. (38.30.43.21)
- Chouibani, M.**, D.P.V.C.T.R.F., B.P. 1308, Rabat, Morocco. (3) MOR
- Cinar, O., Cukurova Univ., Dept. of Plant Protect., 01330 (1) TUR
Adana, Turkey (71-14-50-21(45)).
- Civerolo, E. L., Nat. Prog. Staff, U.S. Department of (2) USA
Agriculture, Room 230, Building 005, BARC-West,
Beltsville, MD 20705. (301-344-3915; FAX: 344-5467)
- Cline, R. A., Horticulture Research Institute of Ontario, (2) CND
Vineland Station, Ontario LOR 2E0, Canada. (416-562-4141)
- Cooper, R. M., School of Biol. Sciences, Univ. of Bath, (1) UK
Claverton Down, Bath, Avon BA2 7AY, England.
(0225-826826; FAX: 826779)
- Coulombe, L. J., Agriculture Canada, P.O. Box 457, St. Jean, (2) CND
Quebec J3B 6B8, Canada. (514-346-4494)
- Cummins, J. N., Department of Pomology & Vitic., N.Y. State (1) USA
Agr. Expt. Station, Geneva, NY 14456. (315-787-2233)
- Cvjetkovic, B., Dept. of Plant Path., Univ. of Zagreb, (2) YUG
Faculty of Agric., Svetosimunska c.25, 41000 Zagreb
(Croatia), Yugoslavia. (41-235-777; FAX: 233-519)
- Dalchow, J., Pflanzenschutzdienst, Postfach 930129, Fr. W. (1) BRD
von Steuben Str. 2, 6000 Frankfurt 93, Germany
(069-775051-3)
- Dale, T., Norwegian Plant Inspection Service, P.O. Box 94, (2) NOR
Okern, 0509 Oslo 5, Norway. (47-2648887)
- Davidson, J. G. N., Agriculture Canada, Research Station, Box (2) CND
29, Beaverlodge, Alb. T0H 0C0, Canada. (403-354-2212)

- Deckers, T.**, Opzoekingsstation van Gorsem, Brede Akker 3, (1) BLG
3800 St. Truiden, Belgium. (011-682019; FAX: 674318)
- De Ley, J., Lab. voor Microb. en Microb. Genetica, Rijksuniv. (1) BLG
Gent, K. L. Ledeganckstr. 35, 9000 Gent, Belgium.
(22-78-21)
- De Wael, L., Research Station for Nemat. and Entom., Burg. (2) BLG
van Gansberghelaan 96, 9820 Merelbeke, Belgium
(091-52-20-85).
- del Solar, C.E., Departamento Frutic., Univ. Catolica de (3) CHL
Chile, Moneda 611, Dept. 51, 1 Santiago, Chili. (384200)
- Dimova-Aziz, M.**, Plant Protection Section, Department of (1) CYP
Agriculture, Nicosia, Cyprus. (02-302273; FAX: 445156).
- Dinesen, G.**, Institute of Plant Pathology, Lottenborgvej 2, (2) DK
2800 Lyngby, Denmark. (4287-2510; FAX: 2210).
- Douglas, S.M.**, Dept. of Plant Pathology & Ecology, Conn. (2) USA
Agric. Expt. Sta., P.O. Box 1106, New Haven, CT. 06504
(203-789-7251; FAX: 789-7232).
- Drewitt, W., New Zealand Apple & Pear Board, Private Bag, (2) NZ
Wellington, New Zealand. (04-731-240)
- Duarti, Teresa, Minist. da Agricult., Pescas e Aliment., (3) POR
Inst. Nac. de Invest. Agraria, Tapada da Ajuda, Edificio
1, 1300 Lisbon (63-50-13; FAX: 63-50-16)
- Ebbels, D. L. Ministry of Agric. Fish. & Food, Central (2) UK
Science Lab., Harpenden, Herts AL5 2BD, England.
(0582-715241; FAX: 762178)
- El-Kazzaz, M. K.**, Department of Agric. Botany, Faculty of (1) EGY
Agric., Tanta University, Kafr El-Sheikh, Egypt.
(47-322032; FAX: 323419)
- Ellis, M. A.**, Department of Plant Path., Ohio Agric. Research (2) USA
and Devel. Center, Wooster, Ohio 44691. (216-263-3849;
FAX: 263-3841).
- El-Zayat, M.M., Dept. of Agric. Botany & Plant Path., Ain (2) EGY
Shams Univ., Shoubra El-Kheim, Cairo, Egypt. (22-45-2931)
- Epton, H. A. S., Dept. Cell & Structural Biol. Stopford (1) UK
Bldg., Univ. of Manchester, Oxford Road, Manchester M13
9PT, England. (061-275-3900)
- Ercolani, G. L., Istituto di Microb. Agraria e Tecnica, (2) ITA
Facolta di Agrar., Via Amendola 165/A, 70126 Bari,
Italy. (080-339422)

- European and Mediterranean Plant Protection Organ., (EPP0), 1 (2) FR
rue le Notre, 75016 Paris, France (1-45207794; FAX:
42248943)
- Evans, I. R.**, Alberta Agriculture, Plant Industry Div., 7000 (2) CND
113 Street, Edmonton, Alb. T6H 5T6, Canada.
(403-427-7098; FAX: 422-9745)
- Fahy, P. C., Biological & Chem. Research Institute, NSW Dept. (3) AUS
of Agric. and Fish, P.M.B.10, Rydalmere, NSW 2116,
Australia. (02-683-9777; FAX: 683-9714)
- Fideghelli, C., Istituto Sperim. Frutticoltura, Via di (2) ITA
Fioranello n. 52, Ciampino Aeroporto, 00040 Rome, Italy.
- Fox, R. T. V.**, Dept. of Horticulture, University of Reading, 2 (2) UK
Earley Gate, Reading, RG6 2AU, England. (734-875123;
FAX: 351804).
- Fucikovsky, L.**, Centro de Fitopatologia, Colegio de (1) MEX
Postgraduados, Escuela Nacional de Agricultura, A.P. #85,
56230 Montecillos-Chapingo, Mexico. (595-45211; FAX:
45723).
- Fujita, K.**, Aomori Field Crops and Horticultural Expt. (3) JAP
Station Gonohe, San-nohe-Gun, Aomori 039-07, Japan.
(FAX: 0178-62-4114)
- Garrett, Constance (Connie) M. E., 27 Cowdrey Close, (4) UK
Maidstone Kent. ME16 8PN, England. (0622-727130)
- Geenen, J., Rijksstation voor Plantenziekten, Burg. van (2) BLG
Gansberghelaan 96, 9220 Merelbeke, Belgium. (091-522083)
- Geider, K., Abtlg. Molekulare Biol., Max Planck Inst. fur (1) BRD
Medizin. Forsch., Jahn Str. 29, 6900 Heidelberg,
Germany. (06203-16761).
- Gessner, E., Inst. fur Pflanzenschutz, Saatgutuntersuchung u. (1) BRD
Bienenkunde der Landwirt-Schaftskammer Westf.-Lippe,
Nevingoff 40, 4400 Munster, Germany. (0251-276669).
- Goodman, R. N.**, Dept. of Plant Pathology, 3-18 Agric. (4) USA
Bldg., Univ. of Missouri. Columbia, MO 65211.
(314-882-7043; FAX: 882-0588).
- Graberg, Maria**, Swedish Board of Agric., Plant Protec. (2) SWD
Serv., 55182 Jonkoping, Sweden. (36-155000; FAX: 122522)
- Graf, H., Obstbauversuchsanstalt, Westerminnerweg 22, 2155 (2) BRD
Jork, Germany. (04162-7004)

- Grimm, R.**, Federal Res. Station for Fruit-growing, Vitic. and Hortic., 8820 Wadenswil, Switzerland. (01-783-6307; FAX: 780-6341). (1) SWT
- Gupta, G. K.**, Fruit Path. Lab., Regional Hort. Res. Station, Mashobsa, Shimla, H.P. 171007, India. (3) IND
- Hale, C. N.**, Plant Diseases Div., Dept. of Scient. and Indust. Research, Private Bag, Auckland, New Zealand. (09-893-660; FAX: 893-330). (1) NZ
- Heybroek, H. M., Dorschkamp Research Inst. for Forestry and Landscape Planning, P. O. Box 23, 6700 AA Wageningen, The Netherlands. (08370-95360) (1) NL
- Hickey, K. D.**, Fruit Research Laboratory, Penn. State Univ., Box 309, Biglerville, PA 17307-0309. (717-677-6116; FAX: 677-4112). (2) USA
- Howard, R. J., Alberta Hort. Res. Center, BAG Service 200, Brooks, Alberta T0J 0J0, Canada. (403-362-3391) (2) CND
- Hummer, Kim, Curator, USDA, ARS, Nat. Clonal Germpl. Reposit., 33447 Peoria Rd., Corvallis, OR 97330. (503-750-8712; FAX: 750-8717) (1) USA
- Hunter, C. L., Plant Industry Branch, Ontario Min. of Agric. and Food, P. O. Box 587, Simcoe, Ontario N3Y 4N5, Canada. (519-426-7120) (2) CND
- Hunter, D.M., Agriculture Canada, Research Station, Harrow, Ont., Canada, NOR 1G0, (519-738-2251; FAX: 738-2929). (1) CND
- Ikin, R., Plant Quarant. & Inspect. Branch, Australian Quar. & Inspect. Serv., Dept. of Primary Industries and Energy, P.O. Box 858, Canberra Act. 2601, Australia. (06-272-4238; FAX: 272-5697) (3) AUS
- Inoue, S., Takarazuka Research Center, Sumitomo Chemical Co., Ltd., 2-1, 4-Chrome Takatsukasa, Takarazuka, Hyogo 665, Japan. (0797-74-2018) (3) JAP
- Ivantic, S.M., Plant Health Department, Secret. de Agric., Ganaderia y Pesca, Paseo Colon 922, 3°Peso, Off. 344, 1063 Buenos Aires, Argentina. (3) ARG
- Jackson, L.E., 1466 Sumac Drive, Logan, UT 84321. (801-752-1714). (1) USA
- Janick, J., Department of Horticulture, Purdue University, West Lafayette, IN 47907. (317-494-1329). (1) USA

- Janse, J. D., Plant Protection Serv., Geertjesweg 15, P.O. Box 9102, 6700 HC Wageningen, The Netherlands. (08370-96300) (1) NL
- Jespersion, Gayle D., Brit. Columb. Ministry of Agric., 1873 Spall Rd., Kelowna, BC V1Y 4R2 (604-861-7211) (2) CND
- Jones, A. L.**, Department of Botany & Plant Path., Michigan State Univ., East Lansing, MI 48824. (517-355-4573; FAX: 353-5598). (1) USA
- Joseph, E., Office Federale, de l'Agriculture, Martenhofstr. 5, 3003 Bern, Switzerland. (031-612565) (2) SWT
- Joshi, M.M., Agric. Products Dept., DuPont Chem. Co., Stine-Haskell Res. Center, Bldg. 200, Newark, DE 19711. (916-752-0325) (2) USA
- Kado, C.I., Dept. of Plant Path., Univ. of California, Davis, CA 95616. (916-752-0325) (2) USA
- Keck, Marianne**, Bundesanstalt für Pflanzenschutz, Trunnerstrasse 5, 1020 Vienna, Austria. (0222-21113-287; FAX: 21-60-825). (3) OST
- Klement, Z., Dept. of Pathophysiology & Disease Resistance, Plant Protection Institute, Herman Otto u. 15, P.O. 102, 1022 Budapest, Hungary. (358-137) (3) HUN
- Knosel, D., Inst. für Angewandte Botanik, Univ. of Hamburg, Marseiller Str. 7, 2000 Hamburg 36, Germany. (040-4123-2353) (1) BRD
- Koenigshof, R., Pear Research Association, Box 4050, Kerlikowske Rd., Coloma, Michigan 49038. (616-849-2375) (2) USA
- Krebs, E.K., Pflanzenschutzamt Hannover, Wunstorfer Str. 9, 3000 Hannover, Germany. (0511-4005173) (2) BRD
- Kudela, V.**, Institute of Plant Protection, Research Inst. of Crop Production, Drnovska 507, 16106 Prague 6, (Ruzyne), Czechoslovakia. (2-360851-9-457; FAX: 365228) (1) CZE
- Kural, I., Zirai Mucadele Arastirma Enstit., 21100 Diyarbakir, Turkey (831-13501). (1) TUR
- Laere, O. van, Research Station for Nematology and Entomology, Burg. van Gansberghelaan 96, 9220 Merelbeke, Belgium. (091-52-20-85) (1) BLG
- Larue, P., Service de la Protection des Vegetaux, Lycee Agricole de Dax, B.P.I. Heugas. 40180 Dax, France. (1) FR

- Laurent, Jacqueline, Pathologie Vegetale - INRA, 16 Rue
Claude Bernard, 75231 Paris Cedex 05, France.
(1-43-31-93-97; FAX: 31-83-82. (1) FR
- Lecomte, P., Laboratoire Feu Bacterien (INRA), Lycee Agricole
de Dax, B.P. 1, Heugas, 40180 Dax, France.
(16-58-98-73-11) (1) FR
- Lehmann-Danzinger, H., Inst. fur Pflanzenpath. und
Pflanzensch., Grisebachstr. 6., 3400 Gottingen, Germany.
(0551-393716) (1) BRD
- Letal, J., Alberta Tree Nursery and Hortic. Centre, RR #6,
Edmonton, Alberta T5B 4K3, Canada. (403-422-1789) (2) CND
- Le Lezec, M., Station d'Arboriculture Fruit., INRA, Route de
St. Clement, Beaucouze 49000 Angers, France (44-73-51-08). (2) FR
- Lin, C.P.**, Dept. of Plant Pathology and Entomology, National
Taiwan Univ., Taipei, Taiwan, Rep. of China (ROC) (3) TAW
- Lindow, S., Dept. of Plant Path., Univ. of California,
Berkeley, CA. 94720 (2) USA
- Locke, T., Minist. of Agric., Food and Fish., ADAS,
'Woodthorne', Wolverhampton WV6 8TQ, England. (2) UK
- Lombard, P. B., Department of Horticulture, Oregon State
University, Corvallis, OR 97331. (503-754-3695) (2) USA
- Lopes Barardo, R., Delgada, 2540 Bombarral, Portugal.
(062-62897) (3) POR
- Lopez Gonzales, M., Dept. Proteccion Vegetal, I.N.I.A., CRIDA
07, Moncada-Valencia, Spain. (739-1000) (3) SPN
- Luby, J., Dept. of Horticulture, Univ. of Minnesota, 1970
Folwell Ave., ST. Paul, MN 55108. (2) USA
- Mainolfi, P., Minist. dell'Agricoltura, via XX Settembre 20,
00187 Rome, Italy (06-488-4293). (2) ITA
- Manganaris, A., Pomology Institute, 59200 Naoussa, Greece.
(01-0332-41548) (2) GRC
- Mansergas, A. J. F., Ministerio de Agric., Dept. de Frutic.,
Apartado 202, Zaragoza, Spain. (976-29-72-07) (3) SPN
- Mappes, D., BASF, Agricultural Research Station, P.O. Box
220, 6703 Limburgerhof, Germany. (6236-682299) (2) BRD
- Markovic, S., Federal Secretariat for Agric., Bulevar AVNOJA
104, 11070 N. Belgrade, Yugoslavia. (604-669) (2) YUG

- Maroquin, C., Station de Phytopathologie de l'Etat, 13 Ave. Marechal Juin, 5800 Gembloux, Belgium. (081-612094 or 612099) (2) BLG
- × **Martins, J. M. S.**, Dept. Fitopatologia, Estacao Agronomica Nacional, 2780 Oeiras, Portugal. (1-4431505) (3) POR
- Massfeller, D., Pflanzenschutzamt der Ldw. Kammer Rheinland, Siebengebirgsstr, 5300 Bonn-3, Germany. (0228-434150) (1) BRD
- Mazzucchi, U., Laboratorio Fitobatter., Istituto Patol. Veget., via Filippo Re 8, 40126 Bologna, Italy. (051-236175) (1) ITA
- McLaughlin, R., USDA, ARS, Tree Fruit Research Lab, 1104 N. Western Ave., Wenatchee, WA 98801. (509-664-2280; FAX: 664-2287). (1) USA
- McPhee, W. J., Okanagan Similkameen Coop. Growers Assoc., East 9th St., Oliver, BC V0H 1T0 Canada. (604-498-3491) (2) CND
- Mendoza, H. A., Centro de Fitopatologia, Colegio de Postgraduados, 56230 Montecillo, Edo. de Mexico, Mexico. (595-4-52-11) (1) MEX
- Meyer, F. C.**, Catedra de Fitopat., Facultad de Ciencias Agrarias, Univer. Nacional del Comahue, 8303 Cinco Altos, Argentina. (3) ARG
- Meyer, J., Amt fur Land-und Wasserwirtschaft, Abteilung Pflanzenschutz, Herzog-Adolf Strasse 1b, 225 Husum, Germany. (04841-2746) (1) BRD
- Michel, H. G., Landesanstalt fur Pflanzenschutz, Reinsburgstr. 107, 7000 Stuttgart - 1, Germany. (0711-6676-2575 or 73) (2) BRD
- Michon, P., 3-M. Health Care, 40 Rue Gabriel Crie, 92245 Malakoff Cedex, France. (2) FR
- Mielke, G., Mid-Columbia Expt. Sta., 3005 Expt. Station Drive, Hood River, OR 97031 (2) USA
- Mikkelsen, Else, The Danish Plant Protect. Service, Gersonvej 13, 2900 Hellerup, Denmark (01-620787) (2) DK
- Miller, R. W.**, Dept. of Plant Path. and Physiol., 206 Long Hall, Clemson Univ., Clemson, SC 29634-0377. (803-656-5732; FAX: 656-0274) (2) USA
- Momol, M. T.**, Plant Prot. Dept., Akdeniz Universitesi, Ziraat Fakultesi, Bitki Koruma, Bolumu, Antalya, Turkey. (90-31-274560; FAX: 274564) (1) TUR

- Morton, H. V., Ciba-Geigy Corp., P.O. Box 18300, Greensboro, NC 27419. (919-292-7100, ext. 2756) (2) USA
- Mosegaard, J., Dansk Plantekoleejer Forening, Elmedals Allee 33, 5250 Fruens Boge, Denmark. (2) DK
- Muir, J., Alberta Agriculture, Crop Protection Lab., P.O. Box 7777, Fairview, Alberta, T0H 1L0, Canada. (2) CND
- Nachtigall, M., Biologische Zentralanstalt, Institut für Phytopath., Theodor-Roemerweg, Postfach 162, 4320 Aschersleben, Germany. (00457-5141; FAX: 2709) (1) BRD
- Nassan Agha, N.**, Institut. National Agronom., Lab. de Phytopathologie, 16200 El-Harrach, Algeria. (02-761987 ext. 271) (3) ALG
- Naumann, K.**, Bundesanstalt für Zuchtungsforschung, Institut für Pathogendiagnostik, Theodor-Roemerweg 4, 4320 Aschersleben, Germany. (37-457-5141; FAX: 457-2709) (1) BRD
- Nemeth, J., Plant Health and Soil Conserv. Station, Bacteriol. Lab., P.O. Box 13, 7615 Pecs, Hungary. (72-25-299; FAX: 15-527) (3) HUN
- Nishio, T., Yokohama Plant Protec. Sta., Min. of Agric. Forest. and Fish, 1-16-10 Shin-Yamashita, Naka-ku, Yokohama 231, Japan. (045-622-8892). (3) JAP
- Norelli, J. L., Department of Plant Pathology, N.Y. State Agric. Expt. Station, Geneva, NY 14456. (315-787-2317) (1) USA
- Noval, Cristina, Subdireccion General de Sanidad Vegetal, C/Juan Inst. Nacional de Investig. Agrarias, Bravo, 3-B 1ª planta, 28006 Madrid, Spain. (401-30-28) (3) SPN
- Nuncio, O., Apartado Postal 576, Saltillo, Coah., Mexico
- Oberhofer, H., Sudtiroler Beratungsring für Obst und Weinbau, A. Hoferstrasse 9, 39011 Lana, Sudtirol, Italy. (2) MEX
- Oberhofer, H., Sudtiroler Beratungsring für Obst und Weinbau, A. Hoferstrasse 9, 39011 Lana, Sudtirol, Italy. (2) ITA
- O'Connor, P. A., Dept. of Hortic., Univ. of Illinois, 1-A Hort. Field Lab, 1707 S. Orchard St., Urbana, IL 61801 (1) USA
- Ognjanov, V., Faculty of Agric., Inst. for Fruitgrowing, V. Vlahovica 2, 21000 Novi Sad, Yugoslavia. (021-20-052) (2) YUG
- Oktem, Y.E., Zirae Mucadele Arastirma Enstitusu, Fatih Cad., No. 37, Kalaba (Ankara), Turkey. (1) TUR

- Opgenorth, D. C., Department of Plant Pathology, Univ. of California, Riverside, CA 92507. (714-787-4119) (2) USA
- Palazon, I.**, Departamento de Proteccion Vegetal, Centro de Investigaciones y Desarrollo Agrario del Ebro, Apartado 727, 60080 Zaragoza, Spain. (76-709311) (3) SPN
- Panagopoulos, C. G., Laboratory of Phytopath., Athens College of Agric. Sciences, Votanikos, 11855 Athens, Greece. (01-3468-437) (2) GRC
- Panic, M.**, Dept. of Plant Path., Faculty of Agric., Univ. of Belgrade, Nemanjina 6, 11081 Belgrade (Zemun), Yugoslavia. (11-615-315; FAX: 193-659). (1) YUG
- Pashiardis, S., Meteorological Service, Nicosia, Cyprus. (30-3301) (2) CYP
- Paulin, J. P.**, Station de Pathol. Veget., I.N.R.A., 42 rue Georges Morel, B.P. 57, 49071 Beaucouze, CEDEX Angers, France. (41-73-51-90; FAX: 73-51-01). (1) FR
- Pecknold, P. C.**, Dept. of Botany & Plant Path., Purdue Univ., West Lafayette, IN 47907. (317-463-7861; FAX: 494-0363). (1) USA
- Penev, R.**, Fruit Growing Institute, Ostromila 12, 4004 Plovdiv, Bulgaria (32-77-13-49; FAX: 26-57-47). (1) BUL
- Persson, Paula, Dept. of Plant and Forest Protection, Swedish Univ. of Agric. Sciences, P.O. Box 7044, 75007 Uppsala, Sweden (018-67-10-00) (2) SWD
- Preiser, F.**, Research Laboratories. Merck and Company, Inc., Bldg. R123-12, Rahway. NJ 07065. (201-574-6687) (2) USA
- Prive, J.P.**, Agriculture Canada, Sen. M.J. Michaud Exp. Farms, Bonctonche, N.B. EOA 1G0, Canada. (506-743-2464; FAX: 743-8316) (2) CND
- Psallidas, P. G.**, Benaki Phytopath. Institute, 8 Delta St., 14561 Kiphissia, (Athens), Greece. (01-8087-832; FAX: 8077506) (1) GRC
- Pscheidt, J.W.**, Dept. of Botany & Plant Path., Plant Clinic, Cordley Hall 1089, Oregon State Univ., Corvallis, OR 97331-2903 (503-737-3472; FAX: 737-3479). (1) USA
- Rackham, R. L., Benton County Extension Service, 2720 N.W. Polk Street, Corvallis, OR 97330. (503-776-7371) (1) USA
- Raukovic, M., Fruit Research Institute, 32000 Cacak, Yugoslavia. (032-47-411) (2) YUG

- Richiteanu, A., Trustul Pomiculturii, 0300 (3) ROM
Pitesti-Maracineni, Romania. (916-32066)
- Richter, K., Bundesanstalt fur Zuchtungsforchung, Inst. fur (1) BRD
Epidemiologie, Theodor-Roemerweg 4, 4320 Aschersleben,
Germany. (37-457-5141; FAX: 2709)
- Ries, S. M.**, Department of Plant Path., Univ. of Illinois, (2) USA
N-427 Turner Hall, 1102 S. Goodwin, Urbana, IL 61801.
(217-333-1523; FAX: 244-1230).
- Ristevski, B., Fruit Research Station, Faculty of Agric., (2) YUG
91000 Skopje, Yugoslavia. (091-230-557)
- Ritchie, D. F.**, Department of Plant Path., N. C. State Univ., (2) USA
Raleigh, NC 27695. (919-737-2721; FAX: 737-7716)
- Roberts, I., Dept. of Microbiology, Univ. of Leicester, (1) UK
Leicester, LE1 7RH, England.
- Rom, R. C., Dept. of Hortic., Room 316, Plant Science Bldg., (2) USA
Univ. of Arkansas, Fayetteville, AR 72701. (501-575-2603)
- Roos**, Isabel M.M., INFRUITCO, Private Bag 5013, Stellenbosch (3) SA
7600, South Africa. (2231-99090; FAX: 98669)
- Rosenberger, D. A., New York Agric. Exp. Station, Hudson (2) USA
Valley Lab, P.O. Box 727, Highland, NY 12528-0727.
(914-691-7151)
- Rossini, Mirta, N., Estacion Experim. Alto Valle, Casilla de (3) ARG
Correo 782, 8332 General Roca, Rio Negro, Argentina
(0941-25017).
- Rowson, G. R., Farms Div., Showerings Ltd., Woolston, North (1) UK
Cadbury, Yeovil, Somerset, BA22 7BL, England. (0963-40166)
- Rudolph, K., Institut fur Pflanzenpath. und Pflanzensch., (2) BRD
Grisebachstr. 6, 3400 Gottingen, Germany. (393721)
- Saad, A.T.**, Dept. of Plant Path., School of Agric., Amer. (2) LBN
Univ. of Beirut, P.O. Box 11-0236, Beirut, Lebanon. (In
USA: AUB, 850 Third Avenue, New York, NY 10022)
- Saad, B.A., Inspection Region. de la Protec. des Vegetaux, (3) MOR
B.P. Ag., Fes, Morocco. (05-62-48-16)
- Sampson, P. J., Department of Agriculture, G.P.O. Box 192B, (3) AUS
Hobart, Tasmania 7001, Australia (002-284851).
- Sands, D. C., Dept. of Plant Path., Montana State Univ., (2) USA
Bozeman, MT 59717. (406-994-4832)

- Sawatzky, R.**, Dept. of Hortic. Science, Univ. of Saskatchewan, Saskatoon, Sask. S7N 0W0, Canada. (306-343-4241; FAX: 966-8670). (1) CND
- Scheer, H. A. T. van der, Research Station for Fruit Growing, Brugstraat 51, 4475 AN Wilhelminadorp, The Netherlands. (01100-16390) (2) NL
- Schlegel, C., Pfingstbergstrasse 35, 6800 Mannheim 81, Germany. (06203-5006). (2) BRD
- Schroth, M. N., Department of Plant Pathology, Univ. of California, Berkeley, CA 94720. (415-642-4147) (1) USA
- Schulz, F. A., Dept. of Phytomedzin, Tech. Univ. Berlin, Lentzeallee 55-57, 1000 Berlin, Germany. (030-3147-1175) (1) BRD
- Schumann, Ingeborg, LV6, Munsterstrasse 62, 4400 Munster-Wolbeck, Germany (2506-3090; FAX: 30933) (1) BRD
- Seem, R. C., Department of Plant Path., N.Y. State Agric. Expt. Station, P. O. Box 462, Geneva, NY 14456. (315-787-2366) (2) USA
- Severin, V., Laboratory of Phytobacteriology, Research Inst. for Plant Protection, Blvd. Ion Ionescu de la Brad 8, Bucharest-Baneasa, Romania. (33-58-50-58) (3) ROM
- Shabi, E.**, Division of Plant Pathology, Agricultural Research Organization, Volcani Centre, P.O. Box 6, Bet Dagan 50250, Israel (03-968-3535; FAX: 960-4180) (1) ISR
- Sharma, V. P., Dept. of Plant Pathology, Haryana Agric. University, Hissar 125004, India (3) IND
- Sholberg, P.**, Agriculture Canada, Research Station, Summerland, Brit. Col. V0H 1Z0 Canada. (604-494-7711; FAX: 494-0755). (1) CND
- Sigee, A.C., Dept. of Cell and Struct. Biol., Manchester Univ, Stopford Bldg., Manchester M13 9PT, England. (061-275-3906) (2) UK
- Simon, Erzsebet**, Plant Quarantine Laboratory, Plant Protection and Agrochemical Station, P.O. Box 99, 6801 Hodmezovasarhely, Hungary. (06-64/11-677) (3) HUN
- Singh, B. P., USDA, APHIS, Federal Center Bldg., Room 627, 6505 Belcrest Rd., Hyattsville, MD 20782. (301-436-5215) (2) USA
- Sletten, A.**, Dept. of Plant Pathology, Norwegian Plant Protection Institute, Box 70, 1432 AS-NLH, Norway. (9-949258; FAX: 949226) (2) NOR

- Smith, T.J.**, Chelan-Douglas Extension, 400 Washington, (1) USA
Wenatchee, WA 98801. (509-664-5540; FAX: 664-5246).
- Sobiczewski, P.**, Research Institute of Pomology, ul. (1) POL
Pomologiczna 18, 96-100 Skierniewice, Poland. (42-27;
FAX: 32-28)
- Spotts, R. A., Mid-Columbia Expt. Station, 3005 Expt. Station (2) USA
Drive, Hood River, OR 97031. (503-386-2030)
- Stead, D., Min. Agric., Fish, and Food, Central Science Lab. (1) UK
Hatching Green, Harpenden, Herts AL5 2BD England.
(0582-715241 ext. 2265; FAX: 762178).
- Steiner, P.**, Department of Botany, University of Maryland, (1) USA
College Park, MD 20742. (301-405-1601; FAX: 314-9082)
- Stino, G. R., Dept. of Horticulture, Faculty of Agriculture, (2) EGY
Cairo University, Giza (Cairo), Egypt.
- Sugar, D., Southern Oregon Expt. Station, 569 Hanley Rd., (1) USA
Medford, OR 97502. (503-772-5165; FAX: 772-5110)
- Suta, Victoria**, Research Institute for Fruit Growing, 0300 (3) ROM
Pitesti-Maracineni, Romania. (976-34292)
- Sutton, T. B., Department of Plant Pathology, N.C. State (1) USA
Univ., Raleigh, NC 27695-7616. (919-737-2752)
- Swanson, B. T., Dept. of Horticulture, 356 Alderman Hall, (1) USA
Univ. of Minnesota, St. Paul, MN 55108. (612-373-1011)
- Teylingen, M. van**, Plant Protection Service, Geertjesweg 15, (1) NL
6700 HC Wageningen, The Netherlands. (08370-96522; FAX:
21701).
- Thomson, S. V.**, Dept. of Biology, UMC 5305, Utah State (1) USA
Univ., Logan, UT 84322-5305. (801-750-3406; FAX:
750-1575)
- Timmermans, Y., Lab. de Phytopathologie, Centre d'Etudes de (1) BLG
Phytobacterioses, 3 Place Croix du Sud, Sci. 15 D, 1348
Louvain-La-Neuve, Belgium. (010-433755)
- Travis, J. A., Department of Plant Pathology, Penn State (2) USA
University, Buckhart Lab., University Park, PA 16802.
(717-677-6116; FAX: 677-4112)
- Tsiantos, J., Plant Protection Inst., Volos, Greece. (2) GRC
(0421-60601)
- United States Department of Agriculture, Nat. Agric. Library, (2) USA
Serials Unit, Room 002, VC-88549, Agric. Res. Center,
Beltsville, MD 20705.

- VanBuskirk, P.D., Jackson County Extension Service 1301 Maple (1) USA
Grove Drive, Medford, OR 97501 (503-776-7381).
- Vereecke, M., Commission of the Europ. Communities, DG (1) BLG
VI-B.II.1, Rue de la Loi 130, 1040 Brussels, Belgium.
(02-23-63-260)
- Vesely, W., Vyzkumny ustav vcelarsky v Dole, 25266 Libcice (2) CZE
Nad Vltavou, Czechoslovakia. (89-60-86).
- Vidal, R.**, Casilla 12, Teno, Chili. (75-411105). (3) CHL
- Viseur, J., Centre de Lutte Integree en Phytopathologie, (1) BLG
I.R.S.I.A., Avenue Marechal Juin 13, 5800 Gembloux,
Belgium. (081-61-01-26)
- Vondracek, J., Fruit Research Station, Techobuzize, 411 42 (2) CZE
Ploskovice (okr. Litomerice), Czechoslovakia.
(Ploskovice 9387)
- Voronkova, L.**, Dept. of Bacteriology, Central Laboratory for (3) USSR
Plant Quarantine, 1/11 Orlikov per., 107139 Moscow,
B-139, USSR.
- Vuurde, J. W. L. van, Research Institute for Plant Protect., (1) NL
Binnenhaven 12, P.O. Box 9060, 6700 GW Wageningen, The
Netherlands. (08370-19151)
- Walsh, P. F.**, Dept. of Agriculture, Agriculture House, (2) IRL
Kildare St., Dublin 2, Ireland. (01-789011, ext. 2089;
FAX: 616263).
- Willetts, M., Yakima Co. Coop. Ext. Serv., 233 Courthouse, (2) USA
Yakima, WA 98901. (509-575-4242)
- Wimalajeewa, S.**, Institute of Plant Sciences, Dept. of (3) AUS
Agriculture, Burnley Gardens, 621 Burwood Highway,
Knoxfield, P.O. Box 174, Ferntree Gully, (Victoria) 3156,
Australia. (03-881-9222; FAX: 800-3521)
- Wodzinski, R. S., Biology Department, Ithaca College, Ithaca, (1) USA
NY 14850. (607-274-3979)
- Yoder, K. S.**, Fruit Research Lab., Va. Polytech. Inst., 2500 (2) USA
Valley Ave., Winchester, VA 22601. (703-667-8330; FAX:
667-5692).
- Young, Deborah**, Arizona Coop. Extension Serv., P.O. Box (2) USA
388 Prescott, AZ 86302. (602-445-6597).
- Zaccheo, A. via Gaggiolo 34^a, 6855 Stabio, Switzerland (2) SWT

- Zehr, E. I., Department of Plant Pathology & Physiology, (2) USA
Clemson University, Clemson, SC 29631. (803-656-3450;
FAX: 656-0274)
- Zeller, W.**, Biologische Bundesanstalt für Land und Forstwirtschaft, (1) BRD
Institut für Pflanzenschutz, Schwabenheimerstrasse,
Postfach 73, 6901 Dossenheim-Heidelberg, Germany.
(06221-85238; FAX: 86.12.22)
- Zhao, Y.**, Dept. of Phytopathology, Inst. of Plant (3) CHI
Quarantine, Min. of Agric., Liang Ma Qiao, Chao Yang,
Beijing, 100026 China (PRC). (5024843)
- Zoller, B.G.**, The Pear Doctor, Inc., P.O. Box 610, Finley, (2) USA
CA 95435. (707-279-9773; FAX: 707-279-9808)
- Zwet, T. van der, U.S. Department of Agriculture, Appalachian (1) USA
Fruit Research Station, 45 Wiltshire Road, Kearneysville,
WV 25430-9802. (304-728-2329; FAX: 728-2340)

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^{1/} Names with asterisk (*) are contact persons.

<u>England</u> (U. K.)	*Fox, R.T.V. Berrie, A.M. Billing, E. Byrde, R.J.W. Cooper, R.M. Ebbels, D.L. Epton, H.A.S.	Garrett, C.M.E. Locke, T. Roberts, I. Rowson, G.R. Sigee, A.C. Stead, D.
<u>France</u>	*Paulin, J.P. Balavoine, P. Cadic, A. Chevalier, R. EPP0	Larue, P. Laurent, J. Lecomte, P. Le Lezec, M. Michon, P.
<u>Germany</u> (BRD)	*Naumann, K. *Zeller, W. Dalchow, J. Geider, K. Gessner, E. Graf, H. Knosel, D. Krebs, E.K. Lehmann-Danzinger, H. Mappes, D.	Massfeller, D. Meyer, J. Michel, H.G. Nachtigall, M. Richter, K. Rudolph, K. Schlegel, C. Schulz, F.A. Schumann, I.
<u>Greece</u>	*Psallidas, P.G. Manganaris, A.	Panagopoulos, C. G. Tsiantos, J.
<u>Hungary</u>	*Simon, E. Klement, Z.	Nemeth, J.
<u>India</u>	*Gupta, G. K.	Sharma, V. P.
<u>Ireland</u>	*Walsh, P.	
<u>Israel</u>	*Shabi, E.	
<u>Italy</u>	*Bazzi, C. Calzolari, A. Ercolani, G. Fideghelli, C.	Mainolfi, P. Mazzucchi, U. Oberhofer, H.
<u>Japan</u>	*Fujita, K. Inoue, S.	Nishio, T.
<u>Lebanon</u>	*Saad, A.T.	

Mexico

*Fucikovsky, L.
Mendoza, H.A.

Nuncio, O.

Morocco

*Chouibani, M.

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Netherlands

*Teylingen, M. van
Botden, R.J.J.
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PUDOC
Scheer, H.A.T. van der
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New Zealand

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Drewitt, W.

Norway

*Sletten, A.

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Poland

*Sobiczewski, P.

Burkowicz, A.

Portugal

*Martins, J.M.S.
Duarte, T.

Lopes Barardo, R.

Romania

*Suta, V.
Richiteanu, A.

Severin, V.

South Africa

*Roos, I.M.M.

Spain

*Palazon, I.
Carrera, M.
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Mansergas, A.J.F.
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Sweden

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Persson, P.

Switzerland

*Grimm, R.
Bolay, A.
Cazelles, O.

Joseph, E.
Zaccheo, A.

Taiwan (R. O. C.)

*Linn, C.P.

Turkey

*Momol, T.
Basim, H.
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Cinar, O.
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USSR

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Yugoslavia

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Ristevski, B.

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Aldwinckle, H.S.	*Pecknold, P.C.
*Beer, S.V.	*Preiser, F.
Bell, R.L.	*Pscheidt, J.W.
*Biggs, A.R.	Rackman, R.L.
Brown, S.K.	*Ries, S.M.
Bushong, J.W.	*Ritchie, D.F.
Civerolo, E.L.	Rom, R.C.
Cummins, J.N.	Rosenberger, D.A.
*Douglas, S.M.	Sands, D.C.
*Ellis, M.A.	Schroth, M.N.
*Goodman, R.N.	Seem, R.C.
*Hickey, K.D.	Singh, B.P.
Hummer, K.	*Smith, T.J.
Jackson, L.E.	Spotts, B.P.
Janick, J.	*Steiner, P.
*Jones, A.L.	Sugar, D.
Joshi, M.M.	Sutton, T.B.
Kado, G.I.	Swanson, B.T.
Koenigshof, R.	*Thomson, S.V.
Lindow, S.	Travis, J.A.
Lombard, P.	USDA Library
Luby, J.	VanBuskirk, P.D.
McLaughlin, R.	Willett, M.
Mielke, G.	Wodzinski, R.S.
*Miller, R.W.	*Yoder, K.S.
Morton, H.V.	*Young, D.
Norelli, J.L.	Zehr, E.I.
O'Connor, P.A.	*Zoller, B.G.
Opgenorth, D.	Zwet, T. van der

SUMMARY

CONTACT PERSONS FOR FIRE BLIGHT NEWSLETTER

<u>United States</u>		<u>Other Countries</u>	
Arizona	Young, D.	Algeria	Nassan Agha, N.
California	Zoller, B.G.	Argentina	Meyer, F.C.
Connecticut	Douglas, S. M.	Australia	Cartwright, D.N.
Illinois	Ries, S.M.		Wimalajeewa, S.
Indiana	Pecknold, P.	Austria	Keck, M.
Maryland	Steiner, P.	Belgium	Deckers, T.
Michigan	Jones, A.L.	Bulgaria	Penev, R.
Missouri	Goodman, R.N.	Chili	Vidal, R.
New Jersey	Preiser, F.	China (PRC)	Zhao, Y.
New York	Beer, S.V.	Cyprus	Dimova-Aziz, M.
North Carolina	Ritchie, D.F.	Czechoslovakia	Kudela, V.
Ohio	Ellis, M.A.	Denmark	Dinesen, A.
Oregon	Pscheidt, J.W.	Egypt	El-Kazzaz, M.K.
Pennsylvania	Hickey, K.D.	England	Fox, R.T.V.
South Carolina	Miller, R.W.	France	Paulin, J.P.
Utah	Thomson, S.V.	Germany (BRD)	Naumann, K.
Virginia	Yoder, K.S.		Zeller, W.
Washington	Smith, T.J.	Greece	Psallidas, P.G.
West Virginia	Biggs, A.R.	Hungary	Simon, E.
		India	Gupta, G.K.
		Ireland	Walsh, P.
		Israel	Shabi, E.
		Italy	Bazzi, C.
		Japan	Fujita, K.
		Lebanon	Saad, A.T.
		Mexico	Fucikovsky, L.
		Morocco	Chouibani, M.
		Netherlands	van Teylingen, M.
		New Zealand	Hale, C.N.
		Norway	Sletten, A.
		Poland	Sobiczewski, P.
		Portugal	Martins, J.M.S.
		Romania	Suta, V.
		USSR	Voronkova, L.
		South Africa	Roos, I.M.M.
		Spain	Palazon, I.
<u>Canada</u>			
Alberta	Evans, I.R.		
British Columbia	Sholberg, P.		
New Brunswick	Prive, J.P.		
Nova Scotia	Braun, P.J.		
Ontario	Bonn, W.G.		
Saskatchewan	Sawatzky, R.		
Sweden	Graberg, M.		
Switzerland	Grimm, R.		
Taiwan (ROC)	Lin, C.P.		
Turkey	Momol, T.		
Yugoslavia	Panic, M.		

SUMMARY

PERSONS INTERESTED IN FIRE BLIGHT

Country	Interest Category				Total	Number of Contact Persons
	1	2	3	4		
* USA - United States	26	31		1	58	19
* CND - Canada	4	13			17	6
* BRD - Germany	13	6			19	2
* UK - England	6	5		2	13	1
* FR - France	5	5			10	1
* BLG - Belgium	6	3			9	1
* NL - Netherlands	5	2			7	1
* ITA - Italy	2	5			7	1
* YUG - Yugoslavia	1	6			7	1
* TUR - Turkey	5	1			6	1
* SWT - Switzerland	1	4			5	1
* GRC - Greece	1	3			4	1
* EGY - Egypt	1	3			4	1
* MEX - Mexico	2	1			3	1
* CZE - Czechoslovakia	1	2			3	1
* DK - Denmark		3			3	1
* BUL - Bulgaria	2				2	1
* POL - Poland	1	1			2	1
* CYP - Cyprus	1	1			2	1
* NZ - New Zealand	1	1			2	1
* SWD - Sweden		2			2	1
* NOR - Norway		2			2	1
* ISR - Israel	1				1	1
* IRL - Ireland		1			1	1
* LEB - Lebanon		1			1	1
AUS - Australia			5		5	2
SPN - Spain			5		5	1
ROM - Romania			3		3	1
POR - Portugal			3		3	1
JAP - Japan			3		3	1
HUN - Hungary			3		3	1
ARG - Argentina			3		3	1
CHI - China			2		2	1
CHL - Chili			2		2	1
MOR - Morocco			2		2	1
IND - India			2		2	1
OST - Austria			1		1	1
SA - South Africa			1		1	1
USR - USSR			1		1	1
TAW - Taiwan			1		1	1
ALG - Algeria			1		1	1
TOTAL	85	102	38	3	228	66

* Countries with fire blight.

